

Clouds and the Earth's Radian Energy System (CERES)

Data Management System

CERES Library (CERESlib) Test Plan Release 4 Version 2

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Document Revision Record

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04/11/02	R3V3	343	<ul style="list-style-type: none"> • Updated document to specify that entire contents of the CERESlib subdirectories /bin and /data get promoted to production. • F77 added to abbreviation list. • Updated directory structure diagrams. • Updated File Descriptions. • Updated cover information. • Updated format to comply with standards. 	4.0 App. A App. B App. C Cover All
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1.0 Introduction

The Clouds and the Earth's Radiant Energy System (CERES) is a key component of the Earth Observing System (EOS) program. The [CERES](#) instrument provides radiometric measurements of the Earth's atmosphere from three broadband channels: a shortwave channel (0.3 - 5 μm), a total channel (0.3 - 200 μm), and an infrared window channel (8 - 12 μm). The CERES instruments are improved models of the Earth Radiation Budget Experiment (ERBE) scanner instruments, which operated from 1984 through 1990 on the National Aeronautics and Space Administration's (NASA) Earth Radiation Budget Satellite (ERBS) and on the National Oceanic and Atmospheric Administration's (NOAA) operational weather satellites NOAA-9 and NOAA-10. The strategy of flying instruments on Sun-synchronous, polar orbiting satellites, such as NOAA-9 and NOAA-10, simultaneously with instruments on satellites that have precessing orbits in lower inclinations, such as [ERBS](#), was successfully developed in [ERBE](#) to reduce time sampling errors. CERES continues that strategy by flying instruments on the polar orbiting [EOS](#) platforms simultaneously with an instrument on the Tropical Rainfall Measuring Mission (TRMM) spacecraft, which has an orbital inclination of 35 degrees. In addition, to reduce the uncertainty in data interpretation and to improve the consistency between the cloud parameters and the radiation fields, CERES includes cloud imager data and other atmospheric parameters. The [TRMM](#) satellite carries one CERES instrument while the [EOS](#) satellites carry two CERES instruments, one operating in a fixed azimuth plane scanning mode (FAPS) for continuous Earth sampling and the other operating in a rotating azimuth plane scan mode (RAPS) for improved angular sampling.

1.1 Document Overview

This document, [CERES Library Release 4 Test Plan](#), is part of the CERES Library Release 4 delivery package provided to the Langley Distributed Active Archive Center (DAAC). It provides procedures for installing and testing the CERES Library software. A description of acronyms and abbreviations is provided in [Appendix A](#), a directory structure diagram is contained in [Appendix B](#) and a description of the software and data files is contained in [Appendix C](#).

This document is organized as follows:

- [Section 1.0 - Introduction](#)
- [Section 2.0 - Software Installation Procedures](#)
- [Section 3.0 - Test and Evaluation Procedures](#)
- [Appendix A - Acronyms and Abbreviations](#)
- [Appendix B - Directory Structure Diagram](#)
- [Appendix C - File Description Tables](#)

1.2 CERES Library Overview

The CERES library (CERESlib) contains no PGEs. Rather, it is a collection of routines and utilities used by multiple subsystems. Fortran and C routines are contained within two archive library files: `cereslib.a` and `data_products.a`. Utility scripts are located in the `$CERESLIB/bin` directory.

1.2.1 Archive Library Files: `cereslib.a` and `data_products.a`

For implementation purposes, the Fortran and C routines in CERESlib are divided between two different archive library files: `cereslib.a` and `data_products.a`. The `data_products.a` archive file contains modules related to CERES data products. All other library modules and routines are located within the `cereslib.a` archive file.

1.2.2 Multiple Compiler Versions

There are three different versions of CERESlib included with the CERESlib delivery for the SGI 3800 platform and one version for the CERESlib delivery for the IBM/Linux cluster. These versions correspond to the varied Fortran compiler needs of the different CERES subsystems as well as multiple architectures. The first version of CERESlib for SGI 3800 is located in the `$CERESHOME/lib` directory and uses the NAG Fortran 95 compiler in 32-bit mode (-32). The second is located in the `$CERESHOME/lib/sgi64_lib` directory and uses the SGI Fortran 90 compiler in 64-bit mode (-64). The third is located in the `$CERESHOME/lib/sgi32_lib` directory and uses the SGI Fortran 90 compiler in 32-bit mode (-n32). The single library for the IBM/Linux cluster is located in the `$CERESHOME/lib` directory and uses the XLF 90 compiler in 64-bit mode. At some point in the future, it is hoped that the Fortran compiler needs for all the CERES subsystems can be met with the latest version of the SGI Fortran compiler with regards to the SGI 3800 platform, but does not include the XLF compiler.

1.2.3 CERESlib Version Definition

The CERESlib version is defined by the date of the latest change to the source code within the library. The format of the version is given as YYYYMMDD. The current version of the CERESlib will be documented in the Delivery Memo.

2.0 Software Installation Procedures

This section describes how to install the CERESlib software in preparation for making the necessary test runs at the Langley DAAC. The installation procedures include instructions for uncompressed and untarring the delivered tar files, properly defining environmental variables and compiling the code to create the CERES library files.

2.1 Installation

1. The scripts and makefiles in the CERESlib delivery package expect the CERES environment variable, **\$CERESENV**, to point to a file which sets the following environment variables:

CERESHOME	- Top directory for CERES software
CERESLIB	- Top directory for CERESlib software (this location will be different for the different CERESlib versions)
PGSDAT	- Toolkit database directory. (This variable is set by the Toolkit pgs-dev-env.csh script.)
PGSLIB	- Directory containing the PGSTK Toolkit library
PGSBIN	- Directory location of Toolkit scripts (e.g. smfcompile)
F90	- Pointer to the F90 compiler
F90COMP	- Pointer to the Fortran 90 compilation flags
F90LOAD	- Pointer to the Fortran 90 load flags
CC	- Pointer to the C compiler
CFLAGS	- Pointer to the C compiler compilation flags
PGSINC	- Directory for Toolkit and CERES Message Include Files
PGSMMSG	- Directory for Toolkit and CERES Message Files
PGSDIR	- Directory for Toolkit libraries
ADD_LFLAGS	- A DAAC required environment variable
ADD_LIBS	- A DAAC required environment variable

2. In the installation instructions below, use the following definition for the TAG variable, which is included in the file name of the delivery files.

TAG = R{R#}-{SCCR#}

where R# = CERES Software Release Number
 SCCR# = SCCR Number for the CERESlib Delivery

Ex: **TAG = R2-050**
 for CERES Software Release 2 and GGEOSCCR #050

3. Follow the steps below to install the CERESlib software.

```
source $CERESENV (any version)
mv CERESlib_src_{TAG}.tar.Z $CERESHOME
cd $CERESHOME
```

```
uncompress CERESlib_src{TAG}.tar.Z  
tar xf CERESlib_src{TAG}.tar
```

2.2 Compilation

Complete the following steps to compile the CERESlib source code.

On IBM/Linux cluster:

1. Create the message and message include files

```
source $CERESENV  
cd $CERESLIB/smfc  
$CERESLIB/bin/smfccompile_all.csh  
cd $CERESLIB/bin  
./cp_inc_and_msg_files.csh
```

2. Compile the XLF F90 CERESlib version

```
source $CERESENV  
cd $CERESLIB/src  
./makeall clean  
./makeall
```

On SGI 3800:

1. Create the message and message include files

```
source $CERESENV (the SGI 64-bit version)  
cd $CERESLIB/smfc  
$CERESLIB/bin/smfccompile_all.csh  
cd $CERESLIB/bin  
cp_inc_and_msg_files.csh
```

2. Compile the SGI F90 -64 CERESlib version

```
source $CERESENV (the SGI 64-bit version)  
cd $CERESLIB/src  
makeall
```

Execute the following commands to copy the executables and data files from the SGI 64-bit version directory to the NAG version directory. The NAG version of CERESlib is no longer necessary on *warlock* but the ASDC SIT Team expects the promotion files to be in the NAG directories (/\${CERESHOME}/lib/bin and \${CERESHOME}/lib/data).

```
cd ..bin  
cp *.exe ../../bin  
cd ..data  
cp *.dat ../../data
```

3. Compile the SGI F90 -n32 CERESlib version

```
source $CERESENV (the SGI 32-bit version)
cd $CERESLIB/src
makeall
```

Notes:

- When moving from one version of CERESlib to the other, do not simply change directory locations, but be sure that the appropriate start-up script has been sourced. Failure to do so will cause errors to occur.
- The smfcompile_all.csh script and the makeall scripts will report at the end whether all the operations performed were successful. If problems are encountered, contact one of the CERESlib analysts before proceeding further.
- DAAC personnel may have an alternate procedure for compiling the message files. Any alternate procedure should copy all *message include files* to the \$PGSINC directory and all *message files* to the \$PGSMSG directory.
- Because the compiled message and include files go to the \$PGSMSG and \$PGSINC directories respectively, and because the CERES subsystems will look for these files in these directories and not in the \$CERESLIB subdirectories, it is only necessary that the message files be compiled for one of the CERESlib versions.

3.0 Test and Evaluation Procedures

This section provides instructions for compiling and executing the CERESlib test suite. (See [Section 2.1](#) for an explanation of the CERESENV environment variable.)

The test suite will be executed once for each version of CERESlib. In each case, the runtest script will print a warning message to the screen and pause processing for each problem discovered during execution. If no problems are encountered, then the script will complete without interruption until the end. If problems are encountered, then contact one of the CERESlib analysts.

3.1 Compiling and Executing the SGI 64-bit CERESlib Test Suite

1. Compile SGI F90 CERESlib test suite.

```
source $CERESENV (the SGI 64-bit version)
cd $CERESLIB/test_suites
makeall
```

2. If the makeall script reports SUCCESS, then proceed with the testing.

```
runtest
```

3.2 Compiling and Executing the SGI 32-bit CERESlib Test Suite

1. Compile SGI F90 CERESlib test suite.

```
source $CERESENV (the SGI 32-bit version)
cd $CERESLIB/test_suites
makeall
```

2. If the makeall script reports SUCCESS, then proceed with the testing.

```
runtest
```

3.3 Compiling and Executing the XLF CERESlib Test Suite

1. Compile XLF F90 CERESlib test suite.

```
source $CERESENV
cd $CERESLIB/test_suites
./makeall clean
./makeall
```

2. If the makeall script reports SUCCESS, then proceed with the testing.

```
./runtest
```

| **4.0 CERESlib File Promotion into Production**

After CERESlib testing is complete, the following subdirectories and all their contents should be promoted to the production directories:

1. \$CERESLIB/bin
2. \$CERESLIB/data

It doesn't matter from which version of CERESlib these files are moved.

Appendix A

Acronyms and Abbreviations

CERES	Clouds and the Earth's Radiant Energy System
CERESlib	CERES library
DAAC	Distributed Active Archive Center
EOS	Earth Observing System
EOS-AM	EOS Morning Crossing Mission
EOS-PM	EOS Afternoon Crossing Mission
ERBE	Earth Radiation Budget Experiment
ERBS	Earth Radiation Budget Satellite
F77	Fortran 77
F90	Fortran 90
F95	Fortran 95
NAG	Numerical Algorithms Group
NASA	National Aeronautics and Space Administration
NOAA	National Oceanic and Atmospheric Administration
SGI	Silicon Graphics Incorporated
TRMM	Tropical Rainfall Measuring Mission

Appendix B Directory Structure Diagrams

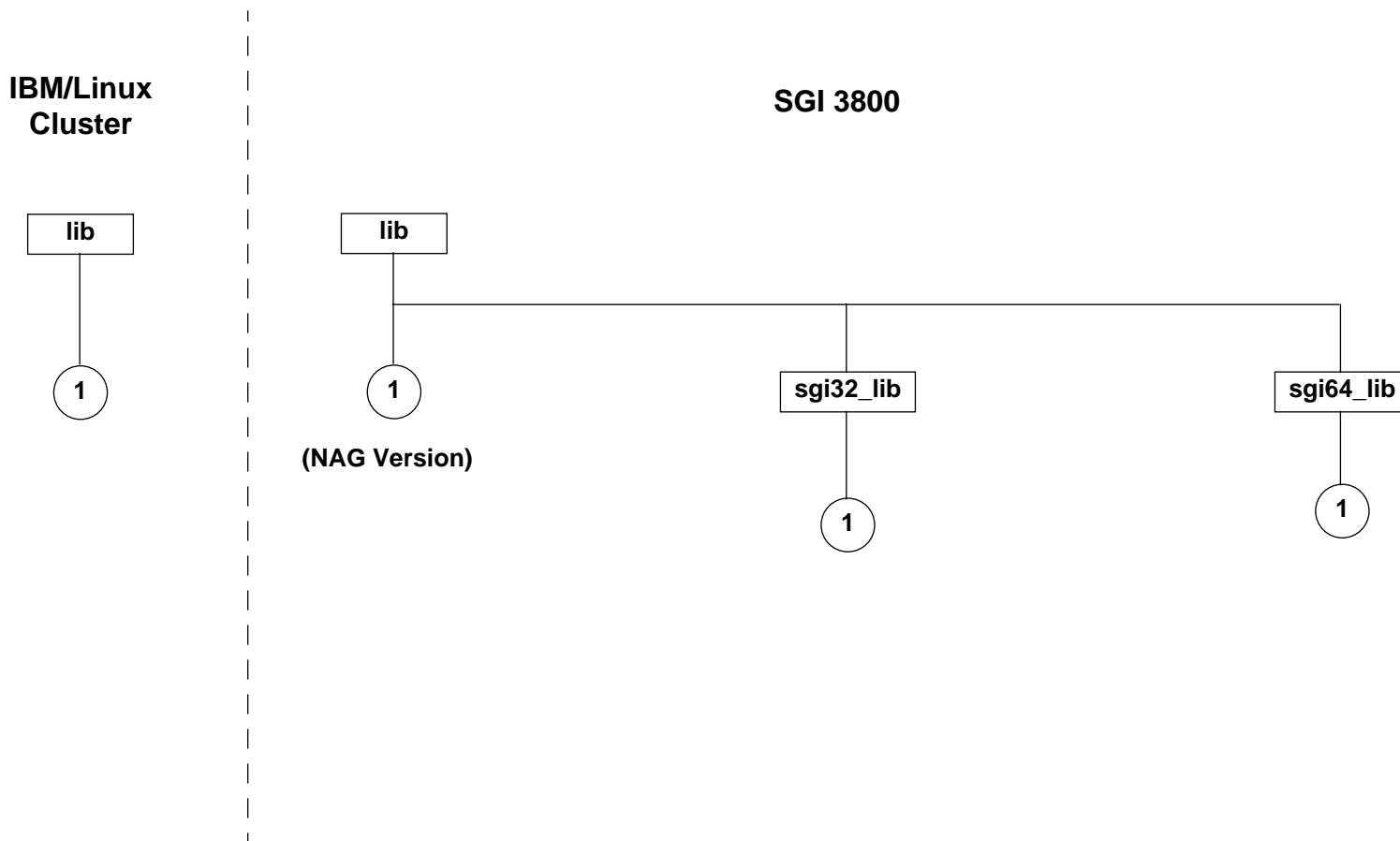


Figure B-1. CERES Library Directory Structure (1 of 6)

B-2

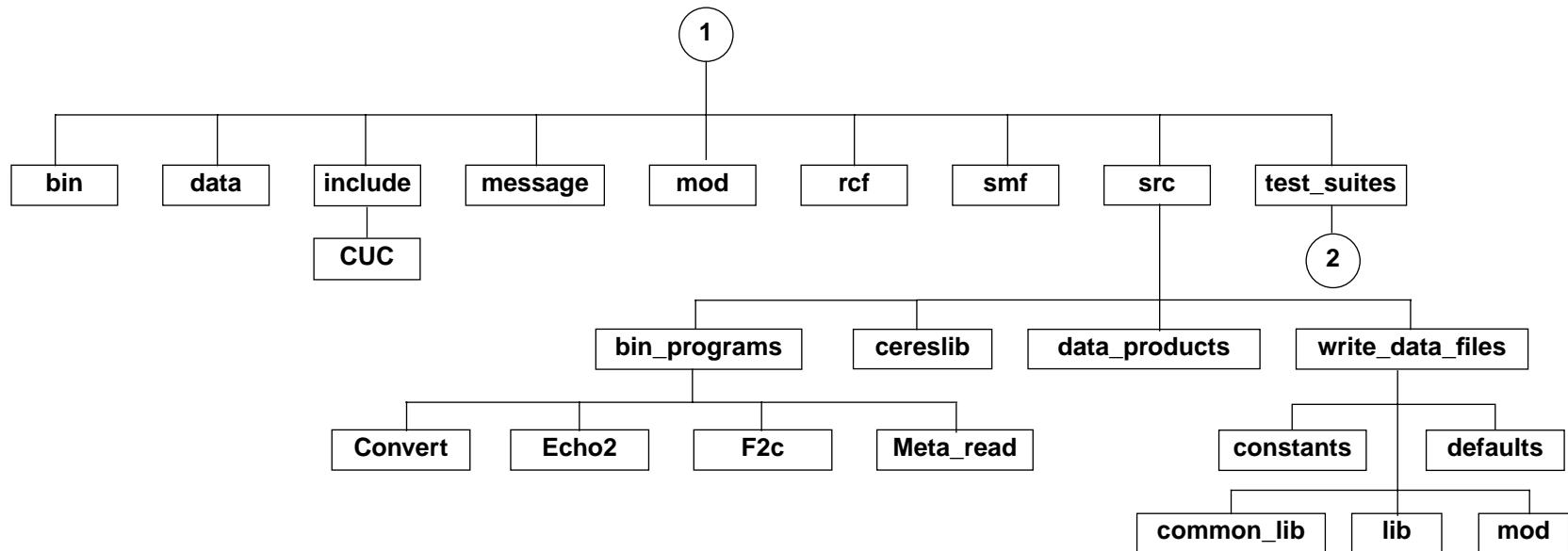


Figure B-1. CERES Library Directory Structure (2 of 6)

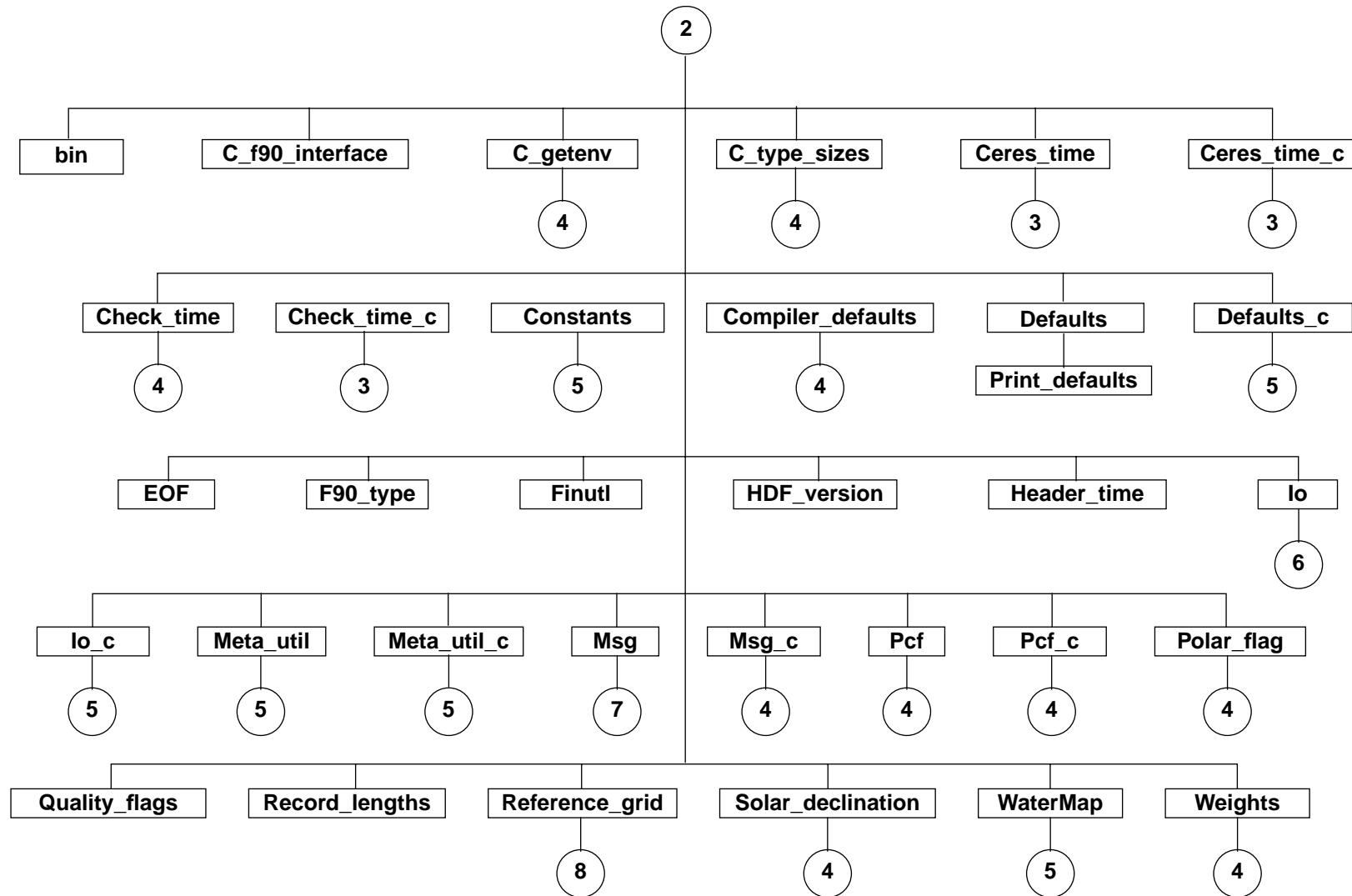


Figure B-1. CERES Library Directory Structure (3 of 6)

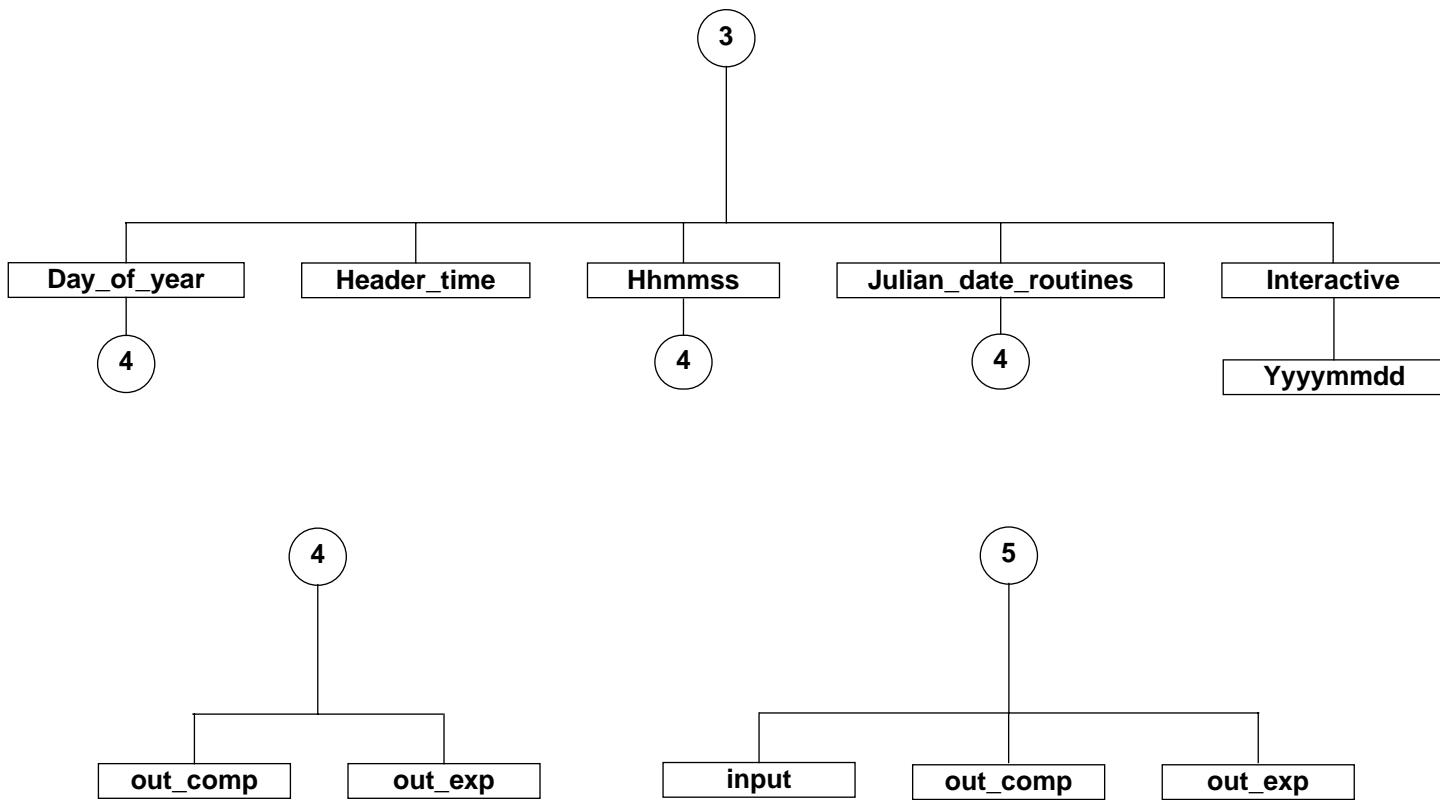


Figure B-1. CERES Library Directory Structure (4 of 6)

B-5

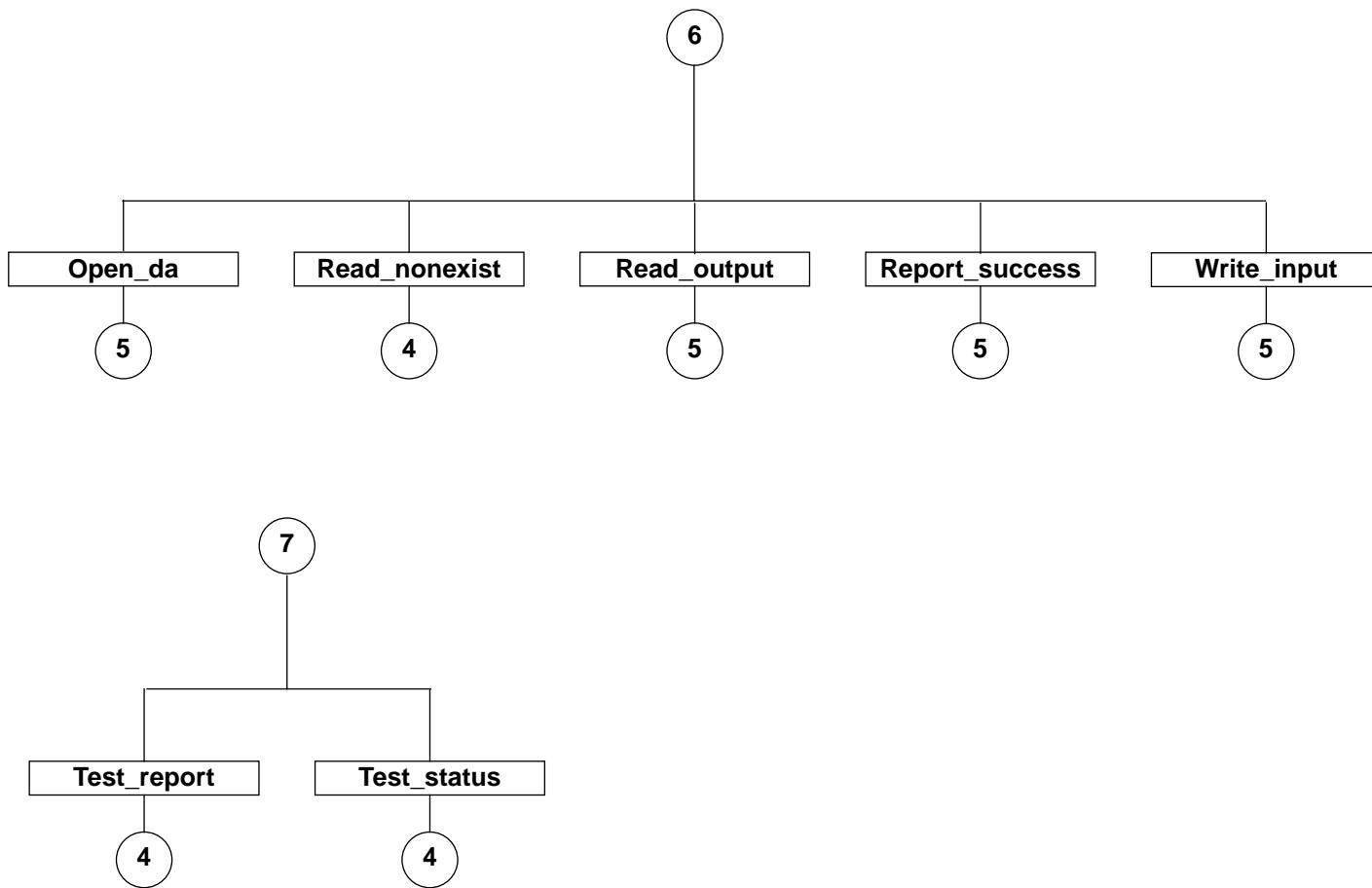
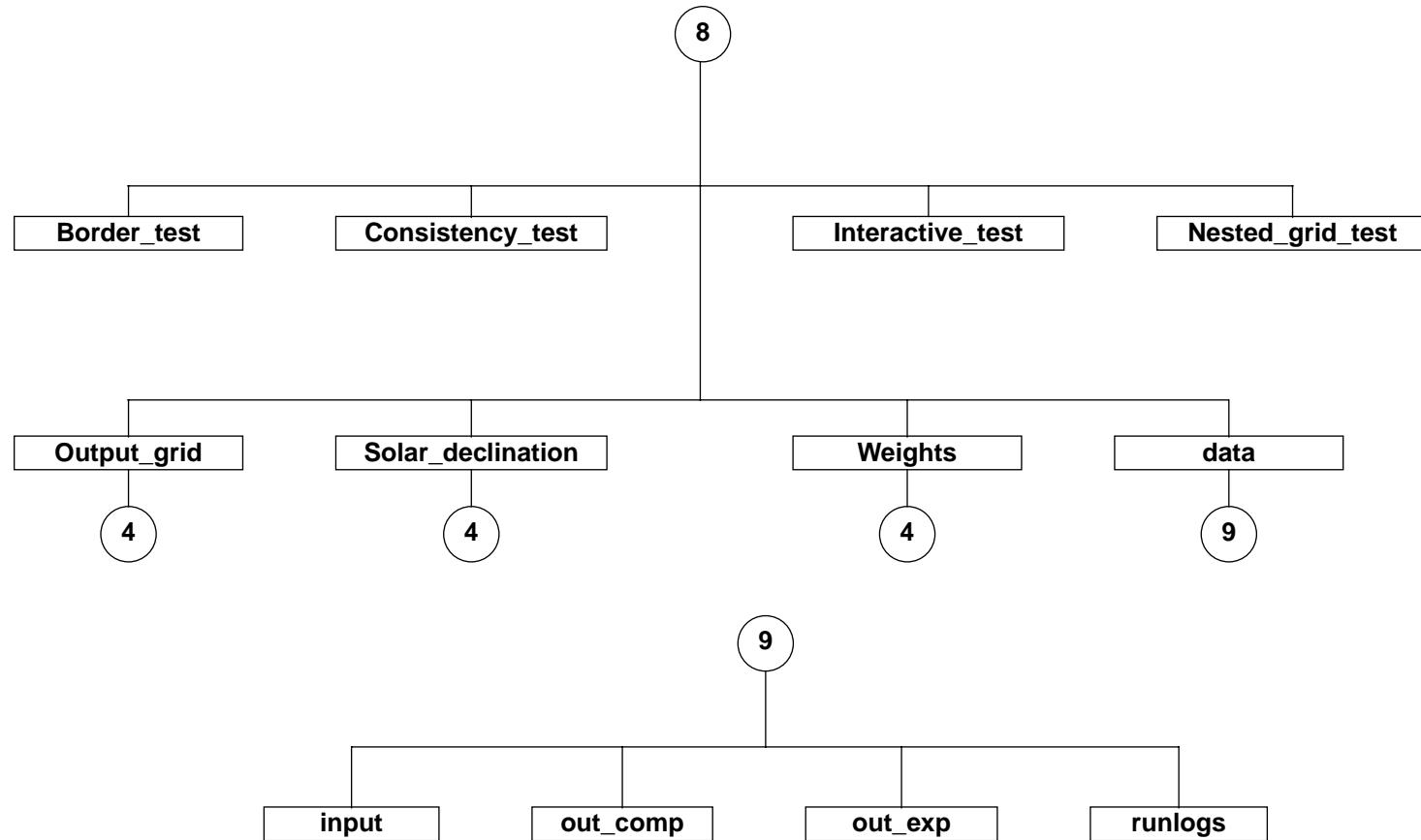


Figure B-1. CERES Library Directory Structure (5 of 6)



B-6

Figure B-1. CERES Library Directory Structure (6 of 6)

Appendix C

File Descriptions

Note that every file found in the lib/ directory or in one of its subdirectories can also be found in the corresponding location under the lib/sgi32_lib/ and lib/sgi64_lib/ directories.

C.1 Production Scripts

Table C-1. lib/bin/ subdirectory (1 of 2)

File Name	Format	Description
border_echo.csh	ASCII	echoes a string with a border
ceresutil	ASCII	CERES utility scripts
check_files.csh	ASCII	checks existence of files
cleanpath	ASCII	removes duplicates entries from path
cmp_binary.csh	ASCII	compares binary files
day_and_hour.csh	ASCII	prints day and hour from the hour of the month
day_of_year.csh	ASCII	prints day of year from year, month, and day
diff_ascii.csh	ASCII	takes a difference between two ASCII files
diff_logs.csh	ASCII	takes a difference between production log files
directory_listing.csh	ASCII	creates a listing of files in a directory
echo_border.csh	ASCII	echoes a string with a border
echo_string.csh	ASCII	echoes a string follows by dots
echo_underline.csh	ASCII	echoes and underlines a string
hour_of_month	ASCII	prints hour of the month from day and hour
last_day.csh	ASCII	prints last day of month given month and year
local_version.csh	ASCII	echoes the local CERESlib version date
numeric_check.csh	ASCII	checks whether an input parameter is numeric
setVariables.csh	ASCII	creates a file with variables identifying the local environment
smfcompile_all.csh	ASCII	compiles and places message files
tarfile_listing.csh	ASCII	creates a listing of files contained in a tarfile
three_digits.csh	ASCII	echoes three-digit numeral from input parameter
tk_version.csh	ASCII	echoes Toolkit version number

Table C-1. lib/bin/ subdirectory (2 of 2)

File Name	Format	Description
two_digits.csh	ASCII	echoes three-digit numeral from input parameter
version.csh	ASCII	echoes the local CERESlib version date and the DAAC CERESlib version date
year_month_day.csh	ASCII	echoes yyyy/mm/dd from year and day of year

C.2 Executables

Table C-2. lib/bin subdirectory

File Name	Byte Size	Description
convert.exe	Binary	Converts F77 files to F90
echo2.exe	Binary	echoes to standard error
f2c.exe	Binary	Converts F77 files to C
grid_interactive.exe	Binary	Runs reference_grid routines interactively
meta_read.exe	Binary	program for reading meta_data

C.3 Status Message Files

Table C-3. lib/smf subdirectory

File Name	Format	Description
CERES_25000.t	ASCII	CERES utility module messages
GFDLAER_25716.t	ASCII	gfdl_aer_clim.f90 module messages
PMOA_FILE_26210.t	ASCII	post_moa_file.f90 module messages
SOLDEC_26400.t	ASCII	solar_declination.f90 module messages
TISA_FSW_25899.t	ASCII	fsw.f90 and fsw_file.f90 module messages
TISA_SFC_26299.t	ASCII	sfc.f90 and sfc_file.f90 module messages
TSI_25910.t	ASCII	tsi_type_mod.f90 module messages
VALREG_25714.t	ASCII	valreg_utils.f90 module messages
crs_io_25700.t	ASCII	crs_io.f90 module messages
ggeofile.t	ASCII	ggeo.f90 and ggeo_file.f90 module messages
moa_io_26500.t	ASCII	moa_io module messages
refgrid.t	ASCII	reference grid module messages
surf_io_26550.t	ASCII	surfmap_io.f90 module messages
syn_index_26001.t	ASCII	syn_index.f90 module messages
syn_io_26000.t	ASCII	syn_io.f90 module messages

C.4 PCF/MCF Templates

Not Applicable

C.5 HDF Read Software

Not Applicable

C.6 Ancillary Input Files

Table C-4. lib/data subdirectory

File Name	Format	Description
CERES_constants.dat	ASCII	CERES constants accessible through Toolkit
CERES_defaults.dat	ASCII	CERES default values accessible through Toolkit
ceres_SI_FM1_day.20020328	ASCII	Static spectral response functions & spectral correction coefficient files
ceres_SI_FM2_day.20020328	ASCII	same as above
ceres_SI_PFM_day.20020328	ASCII	same as above
ceres_SI_FM1_night.20020328	ASCII	Static spectral correction coefficient files
ceres_SI_FM2_night.20020328	ASCII	same as above
ceres_SI_PFM_night.20020328	ASCII	same as above

C.7 Temporary Files

Not Applicable